PATENT SPECIFICATION

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DRAWINGS ATTACHED

1 287 860

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(54) ROTARY PRINTING PRESSES AND SIDE FRAMES THEREFOR

(71) I, WALLACE HERMAN GRANGER, a citizen of the United States of America, of 106 Cypress Avenue, Kentfield, California, United States of America, do hereby declare

the invention, for which I pray that a patent may be granted to me, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to rotary printing presses and side frames therefor.

Printing is generally divided into certain basic types including what may be generally termed letterpress and offset. Both of these types have been adapted to rotary printing presses and both are commonly employed in large and small printing press installations including newspaper printing presses. Letterpress printing provides for the transfer of an impression from the raised surfaces of printing plates to paper passed between a plate cylinder carrying such plates and a resiliently covered impression cylinder. Offset printing provides for the transfer or offset of prints from a plate by the utilisation of an intermediate offset cylinder or blanket cylinder. Modern offset newspaper printing presses normally print blanket-to-blanket, i.e., employ the blanket cylinder for one side of the sheet as the impression cylinder for the other so that printing is accomplished on both sides of the sheet simultaneously.

Many press installations, particularly in the field of rotary printing presses for newspapers, are designed for use of stereotype letterpress printing plates. Oftentimes, however, it is desired to convert from letterpress to offset printing and again particularly in the field of newspaper printing. This is a major operation conventionally requiring the construction and fabrication of complete new printing presses which is not only costly but also time consuming.

Although many of the elements of a rotary stereotype printing press may be employed in an offset press, it has not heretofore been possible to convert one type of press to the other. In an offset press the combined impression and offset cylinders are mounted in a different position from the plate cylinder of a letterpress press and thus it has been necessary to employ different press side frames for the two different kinds of press. This then requires the installation of entirely new presses. It is furthermore to be noted that the thickness of printing plates employed in letterpress and offset printing are markedly different and consequently a plate cylinder that is designed for the use of stereotype printing plates is not readily adaptable for the use of offset printing plates. Either type of printing cylinder is usable in the preferred press of the present invention and a change of printing cylinders can be made "in the field" without press alteration other than the change of said cylinders.

While it would be highly advantageous to be able to progressively convert individual press units of a multiple unit installation from stereotype letterpress to offset printing, such has been previously precluded by the above-noted difficulties. The present invention provides means permitting such a successive conversion.

According to one aspect of the invention there is provided a printing press side frame for a printing couple comprising a rigid side frame structure having a pair of plate cylinder mounting apertures for receiving bearings adapted to encircle plate cylinder trunnions for disposing a pair of plate cylinders in horizontal spaced relationship, said frame having a pair of arcuate openings extending circumferentially of the axes of the plate cylinder mounting apertures from the vicinity of horizontal disposition between the axes of the plate cylinder mounting apertures upwardly and away from each other, said arcuate openings being adapted to receive arcuate impression cylinder mounting blocks and said frame including adjusting screws extending into each end of each arcuate opening for adjustable positioning of mounting blocks therein.

A further aspect of the present invention provides a rotary printing press having side frames for rotatably mounting a pair of

printing cylinders [illegible]orizontal spaced apart relationship, each of the side frames having a pair of arcuate openings with each opening extending as a segment of a circle centered at the axis of a printing cylinder and the openings in each frame being disposed between the printing cylinders and curving upwardly and away from each other, an arcuate mounting block slidably disposed in each arcuate opening and each block carrying a cylinder bearing closer to one end of the block than the other for rotatable mounting of an impression or blanket cylinder, and threaded adjusting means mounted on said frame and extending into opposite ends of each arcuate opening for adjusting the position of the mounting blocks in the openings. Preferably the mounting blocks are sectional in that the repositioning of a section of the block from underneath the cylinder bearing to a position above the cylinder bearing or *vice-versa*, provides for moving the impression cylinder between positions for letterpress or offset printing. In the case where the blocks are not sectional, they can be turned upside down to accomplish the cylinder shift.

In the embodiment later illustrated in detail there are provided adjusting means for precise positioning or repositioning of mounting blocks in the press frame slots and, furthermore, eccentric bearing housings in the mounting blocks with control means therefor. Thus the position of the impression cylinders may be precisely adjusted to accommodate the press for either letterpress or offset printing.

The printing press may also include additional means accommodating the press to both letterpress or offset printing. It will be appreciated that for blanket-to-blanket offset printing the impression cylinders of a dual press normally rotate in the opposite direction from letterpress printing and thus other cylinders of the press are likewise operated in a reverse direction. The inking system for rotary printing presses disclosed in United States Patent Specifications, Serial Nos. 3,587,463 and 3,585,932 may be used with the printing press with minor modifications. Thus the inking fountain is formed to accommodate rotation of the inking roller in either direction and the ink removal or metering roller engaging the ink transfer cylinder or form roller of the system is movable between opposite sides of the ink transfer cylinder, the ink transfer cylinder being adjustably positionable.

The printing press can be adapted for offset printing from stereotype letterpress printing by altering one printing unit at a time by replacing the stereotype plate cylinders with offset plate cylinders and repositioning the impression cylinders. Operation of the press can continue as the change over of the individual print[illegible]units progresses, part of the press being operated with stereotype letterpress printing plates and part with offset printing plates. If the offset printing is by the "wet" method, printing plate dampening units (not shown) will be required and the press side frames will be drilled and tapped at the time of manufacture for ready mounting of the dampening unit. The dampening unit is not required if the printing process is "dry" offset.

Heretofore it has been necessary to manufacture press side frames in accordance with the requirements of the cylinder diameters. The press side frames of the invention will accommodate cylinders for different lengths of the sheet cut-off by placing the mounting holes in the impression cylinder mounting blocks closer to or farther away from the plate cylinder. The plate cylinder and the inking roller are mounted "firm" and the ink transfer cylinder (form roller) is mounted in a slidable bearing that allows straight line movement of the cylinder away from or toward the plate cylinder and inking roller thus allowing for a change in cylinder diameters without a change in press side frames.

With the multi purpose side frames later described in detail and the inking system of the above-noted patent applications, there is provided the capability of relatively simple and inexpensive transformation from letterpress printing to offset printing without the necessity of replacing the printing press.

The present invention is illustrated as to particular preferred embodiments thereof in the accompanying drawings, wherein:

Figure 1 is a side elevational view of an improved press side frame in accordance with the present invention;

Figures 2A and 2B are side elevational views of a sectional mounting block in first position and second position as may be employed in the side frame of Figure 1;

Figure 3 is a sectional detail view taken in the plane 3—3 of Figure 1 and illustrating mounting block adjustment means;

Figure 4 is a partial side elevational view to a larger scale than Figure 1 of a press side frame in order to illustrate eccentric bearing adjustment means;

Figure 5 is a sectional view taken in the plane 5—5 of Figure 4 and illustrating the eccentric bearing housing of a mounting block and adjustment means for the bearing; and

Figures 6A and 6B are schematic illustrations of a single rotary printing press set up for letterpress printing and offset printing respectively.

The drawings illustrate the invention applied to a relatively conventional rotary newspaper printing press. Such a press incorporates relatively massive, rigid side

frames between which [redacted] cylinders, drums and rollers of the press are mounted. There is illustrated in Figure 1 a press side frame 11 having openings therein for receiving bearings rotatably to mount cylinders and the like of a dual press. The openings 12 are provided for the end bearings of a plate cylinder or printing cylinder having an axis 13 at the centre of the openings 12. The openings 14 are adapted to receive end bearings for an inking roller of my above-noted improved inking system and the openings 16 accommodate mounting of movable bearing blocks for the ink transfer cylinders or forme rollers of such system. Inasmuch as the right and left hand portions of the printing couple of a dual press are substantially the same, the following description is primarily referenced to a single side of the press.

The side frames each include a pair of arcuate slots 17 having the same radii of curvature and centered on the two plate cylinder axes 13. The slots 17 have the lower end thereof disposed between the plate cylinder axes 13 and curve upwardly and away from each other for about 60 degrees of arc along constant radii, as indicated by r_1 and r_2 in Figure 1. The side frame slots are provided for the purpose of mounting impression cylinders or blanket cylinders of a printing couple and to this end there are provided arcuate sectional mounting blocks 18 adapted for disposition within the slots 17. The mounting blocks 18 are apertured to carry bearing housings 19, described in more detail below.

Further with regard to the mounting blocks 18 and referring to Figures 2A and 2B, it will be seen that the block is preferably formed of a main portion 21 surrounding the bearing housing 19 and a filler portion 22 abutting the main portion longitudinally of the block. As noted above, the mounting block 18 has an arcuate configuration and is dimensioned slidingly to fit the slot 17 with the main and filler portions of the block aligned longitudinally of the slot. The slot length is slightly greater than the overall length of the mounting block and the filler portion of the block is adapted to be disposed at either end of the main portion 21 of the block. As is clearly shown in Figure 2, reversal of the position of the filler portion 22 of the mounting block provides for relocation of the bearing housing 19 adapted rotatably to carry the impression cylinder or blanket cylinder of the press. The mounting blocks are retained in the side frame slots 17 by plates or the like 23 which may be bolted to the inside and outside of the frame, as indicated in Figure 3.

Provision is made for adjusting the position of the mounting blocks 18 in the slot 17 and to this end there are provided upper and lower adjusting screws [redacted] and 27 respectively. The upper adjusting screw 26, as illustrated in Figure 3, is threaded through the frame 11 from the top thereof to extend longitudinally into the slot 17 and carries a contact plate 28 on the bottom thereof. This contact plate 28 is adapted to engage the upper surface of the mounting block 18 and it will be seen that by turning the adjusting screw 26, the location of this contact plate within the slot is adjustable. A lock nut 29 may be provided for fixing the adjusted position of the contact plate and thus the upper surface of the mounting block. The adjusting screw 26 is preferably provided with calibrations about the head thereof and a pointer 31 secured to the frame cooperates therewith for indicating the position of the adjusting screw. The lower adjusting means 27 may be formed in the same manner as the adjusting means 26 described above and extends in threaded engagement upwardly through the press side frame with a contact plate 32 at the inner end of the adjusting means or screw to engage the underside of the mounting block. Indicating means may also be provided on the adjusting screw 27. A heavy duty coil spring 33 is preferably provided about the lower adjusting screw 27 so that in compression the spring removes much of the load on the screw. Thus the adjusting screws or means 26 and 27 will be seen to be movable to fix the position of the mounting block in the slot 17. It will furthermore be appreciated that the mounting block is maintained at all times at the same distance from the printing cylinder axis 13 inasmuch as any movement of the block in the slot must be about the circumference of a circle about such axis. It is also possible to employ wedges or equivalent means in place of the adjusting screws.

An additional degree of positioning of the blanket or impression cylinder of a rotary printing press is herein provided by an eccentric bearing housing 19 disposed in the mounting block 18. Referring now to Figures 4 and 5, there is illustrated a mounting block 18 in position within a side frame slot 17 with the side retaining plates 23 removed for clarity. The eccentric bearing housing 19 is rotatably mounted within the arcuate shaped mounting blocks 18 as by a bearing or bushing 37 and has a radial extending arm 38 disposed, for example, upwardly of the press frame and on the inner or outer side thereof. An anti-friction bearing 39 extends through the bearing housing 19 off-centre thereof and is adapted to mount a trunnion 41 of an impression cylinder 42. The bearing 39 is retained in the cylinder housing 19 and may, for example, be of the tapered roller bearing type adjustable to zero clearance to prevent any side

play of the cylinder opposite. Thrust bearings may also be provided to prevent end play of the cylinder; however, such are not illustrated herein. The bearings arm 38 extends alongside the side frame 11 as, for example, upwardly thereof whereat a pair of adjusting screws 46 and 47 are mounted in or on the side frame for engagement with opposite sides of the arm. Turning of these adjusting screws 46 and 47 will be seen to pivot the arm 38 and the eccentric bearing housing 19. This then serves controllably to move an impression or blanket cylinder carried by the eccentric housing. Screws 46 and 47 are equipped with calibrated dials and pointers 48 cooperate therewith to facilitate accurate positioning of cylinder 42.

Considering briefly operations involved for changing a rotary newspaper printing press from letterpress or stereotype printing to offset printing, reference is first made to Figure 6A showing the general arrangement of cylinders in a printing couple for stereotype printing. The inking portions of the printing couple are not described herein inasmuch as they are described in the Specification of United States Patent Serial No. 3,585,932. However, each couple includes an inking roller 51 rotating in contact with a forme roller 52 that in turn rotates in contact with a printing or plate cylinder 53. The direction of rotation of the cylinders of the press are indicated in Figure 6A as is the direction of traverse of the web 54 adapted to be printed upon by the press. The impression and plate cylinders 42 and 53 are in rolling contact with the web passing therebetween, as indicated, and an ink removal cylinder 56 engages the ink transfer cylinder 52 for removing surplus ink after ink transfer to the plate cylinder and return of same to a sump for ink recycling. The impression cylinders are seen to be mounted by the mounting blocks 18 with the bearings at the top of the blocks to position the impression cylinders for proper contact with the plate cylinders for letterpress printing.

Modification of the press for offset printing requires, among other things, repositioning of the impression cylinders 42. This is accomplished by first applying an upward force to an impression cylinder to relieve the strain on the bearings as, for example, by strapping the cylinder to an overhead crane and taking a strain on the strap. The mounting block side plates 23 are then removed and the filler section 22 of the mounting block moved laterally out of the arcuate slot 17. This is accomplished by first backing off on the adjusting screws 26 and 27 and then sliding the block 22 laterally out of the frame. With the foregoing accomplished at both ends of an impression cylinder, the cylinder is then lowered as by means of the crane holding same, so that the main portion 21 of the mounting block 18 in each side frame slides downwardly in the side frame slots 17 into engagement with the repositioned lower adjusting means 27. The filler portion 22 of the mounting block is then laterally inserted at the top of the main portion of each block by sliding the filler portion laterally into the slots in the frame. The side retaining plates 23 are then attached to the side frames of the press to retain the mounting blocks in the side frames.

Normally in a conversion of this type, the plate cylinder is replaced and this may be accomplished in accordance with conventional procedures. Additionally, the drive for the cylinders of the press are reversed and with the inking system of the United States Patent No. 3,585,932, the ink removal cylinder 56 is moved to the opposite side of the ink transfer roller or forme roller as indicated in Figure 6B. The inking roller rotates in an ink fountain which may either be formed for operation in either direction of inking roller rotation or, if necessary, may be reversed to ensure that an even coating of ink having a desired thickness is applied to the inking roller as it leaves the fountain.

Small adjustment of the location of the blanket cylinder 42 is provided by the adjusting means 26 and 27 and further precise adjustment is achieved by the eccentric bearing housing 19. A slight rotation of this eccentric bearing housing produces a slight displacement of the blanket cylinder so as to achieve very precise positioning of the blanket cylinders relative to each other and to the plate cylinders. It will, of course, be appreciated that the relative sizes of the portions of the mounting block are predetermined so that reversal of the position of the filler portion substantially locates the impression or blanket cylinder in the proper position for the particular printing to be accomplished by the press. The final press configuration for offset printing is illustrated in Figure 6B.

The press arrangement is also able to accommodate a change in sheet cut-off length. It will be appreciated that such a change requires utilisation of a printing cylinder of different diameter so that an impression or blanket cylinder of equal working diameter would then necessarily be located nearer to or further from the axis of the printing cylinder in order to contact the printing cylinder. The main portion 21 of the mounting block may be replaced by another portion having the opening therein located closer to one side of the block than the other so as to relocate the bearing housing 19. In this manner it is possible to accommodate a change in cylinder diameters and thus a change in sheet cut-off in a printing press without changing the press side frames.

There has been described above a preferred embodiment of the present invention providing the capability of altering a printing press from letterpress or stereotype printing to offset printing. The types of presses normally subject to this type of change are very large with the impression cylinder weighing, for example, 4500 lbs. or so. Because of the massive nature of newspaper printing presses, for example, it is advantageous to accomplish the impression cylinder repositioning by means of the sectionalised mounting block disposed in the arcuate slot as described above. It is, however, possible to employ a unitary mounting block that is reversible in the side frame slot. This then accomplishes the desired change in the same manner as indicated in Figures 2A and 2B.

It is not intended to indicate herein that alteration of a press from letterpress printing to offset printing is accomplished in a matter of minutes and it will be appreciated that such a change normally only occurs once. It is, however, particularly noted that a single letterpress printing press may be modified for offset printing without the necessity of replacing the side frames of the press. The adjustment means for the mounting blocks provide for precise setting of the impression or blanket cylinder for either letterpress or offset printing. It will be appreciated that conventional rotary newspaper printing presses printing by the letterpress or stereotype plate method employ printing plates having a thickness of the order of $^{7}/_{16}$ths of an inch while offset printing is normally accomplished from a thin flexible printing plate wrapped about the printing cylinder and having a thickness of the order of 25 thousandths of an inch. Appropriate means may be provided on the printing cylinder or cylinders to accommodate attachment of either letterpress plates or offset plates, but proper letterpress or offset plate cylinders should be used and when the press is changed over from letterpress to offset, or for the use of thin letterpress printing plates, the plate cylinder should be replaced with a proper cylinder for use with the type of printing plate to be used. The materials employed as the cover for the impression or blanket cylinders may be conventional and are known in the art. A variety of different materials are employed as the blanket on impression cylinders whether the impression cylinders are in use in letterpress or offset presses and, inasmuch as these are commercially available, no description thereof is required. It is, however, noted that the blanket is removably attached to the cylinder.

WHAT I CLAIM IS:—

1. A printing press side frame for a printing couple comprising a rigid side frame structure having a pair of plate cylinder mounting apertures for receiving bearings adapted to encircle plate cylinder trunnions for disposing a pair of plate cylinders in horizontal spaced relationship, said frame having a pair of arcuate openings extending circumferentially of the axes of the plate cylinder mounting apertures from the vicinity of horizontal disposition between the axes of the plate cylinder mounting apertures upwardly and away from each other, said arcuate openings being adapted to receive arcuate impression cylinder mounting blocks and said frame including adjusting screws extending into each end of each arcuate opening for adjustable positioning of mounting blocks therein.

2. A rotary printing press having side frames for rotatably mounting a pair of printing cylinders in horizontal spaced apart relationship, each of the side frames having a pair of arcuate openings with each opening extending as a segment of a circle centered at the axis of a printing cylinder and the openings in each frame being disposed between the printing cylinders and curving upwardly and away from each other, an arcuate mounting block slidably disposed in each arcuate opening and each block carrying a cylinder bearing closer to one end of the block than the other for rotatable mounting of an impression or blanket cylinder, and threaded adjusting means mounted on said frame and extending into opposite ends of each arcuate opening for adjusting the position of the mounting blocks in the openings.

3. A press according to claim 2, wherein each of the arcuate mounting blocks has a rotatably mounted bearing housing carrying a cylinder bearing off-centre therein thus to define an eccentric bearing mount and a lever extending from each housing for controlled angular positioning of the housing thereby precisely to establish the location of the cylinder bearing relative to the axis of the adjacent printing cylinder.

4. A press according to claim 3, wherein the eccentric bearing mount levers each extend to engagement with second threaded adjustment means mounted upon the respective frame for controlled angular positioning of the mount.

5. A press according to claim 2, 3 or 4, wherein the arcuate mounting blocks are sectional with a first portion carrying the cylinder bearing adjacent one end of the block and a separate filler portion extending longitudinally of the block whereby repositioning of the filler portion from one end of the first portion to the other end thereof in said arcuate slot changes the location of the cylinder bearing along the curvature of the slot.

6. A press according to claim 2, 3, 4 or

5, wherein each of the mounting blocks is a replaceable block carrying a cylinder bearing closer to one side of the block than the other whereby a change in sheet cut-off length in a printing press can be accommodated without changing press side frames but by replacement of the bearing block.

7. A printing press side frame constructed and arranged substantially as herein described with reference to and as illustrated in the accompanying drawings.

8. A rotary printing press convertible from offset to letterpress printing, such press being constructed and arranged to operate substantially as herein described with reference to and as illustrated in the accompanying drawings.

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1287860 COMPLETE SPECIFICATION
2 SHEETS This drawing is a reproduction of the Original on a reduced scale
Sheet 1

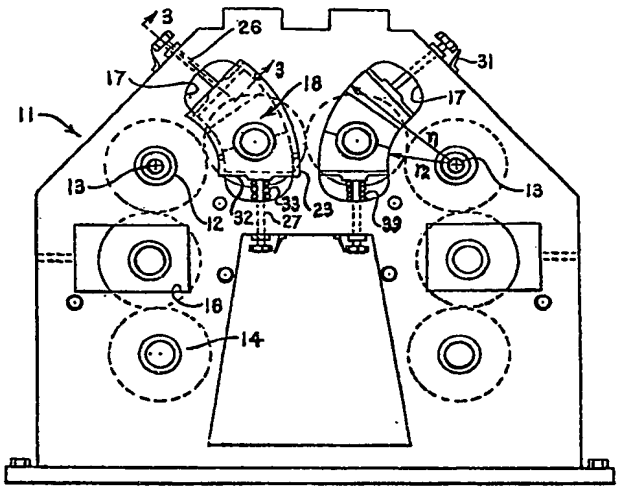


FIG. 1

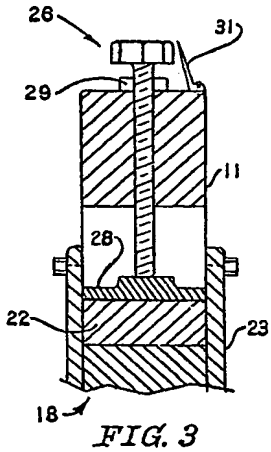


FIG. 3

FIG. 2A

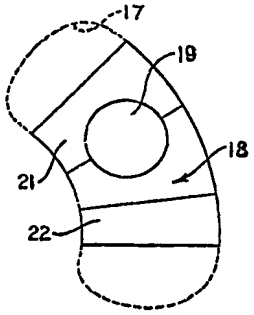
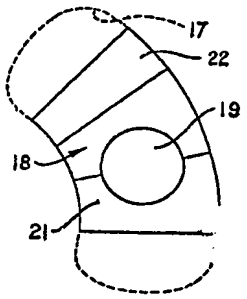


FIG. 2B



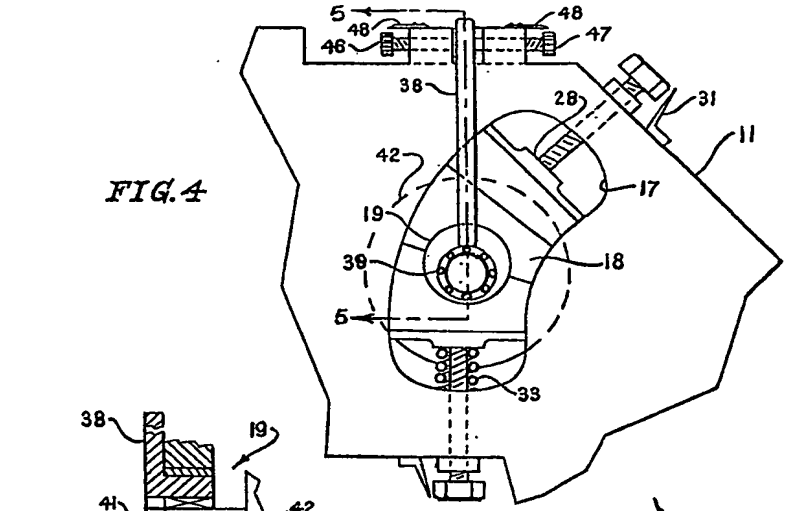


FIG. 4

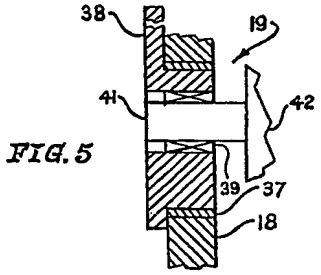


FIG. 5

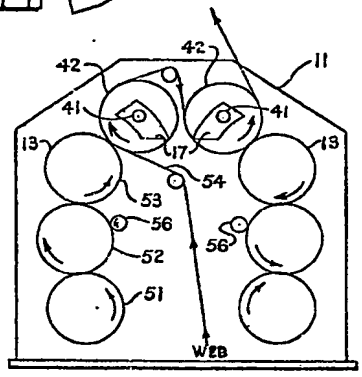


FIG. 6A

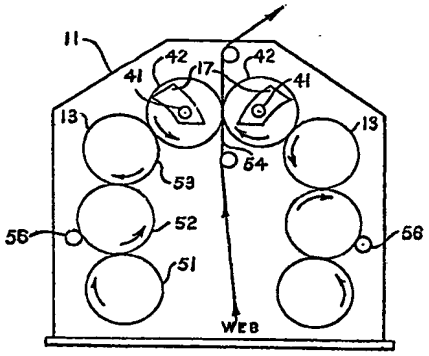


FIG. 6B